Vehicle Technology and Trends 2013

Module 4

I-CAR®

Class 0:25

A-1

MODULE 4–EUROPEAN VEHICLE MAKERS

Topic A. BMW

Learning Objectives

The learning objectives for this module include describing features on new vehicles and technology from:

- **BMW.**
- **Land Rover**
- **Mercedes-Benz.**
- **Porsche.**
- **Volkswagen.**

The learning objectives for this module include describing features on new vehicles and technology from:

- BMW.
- Land Rover
- Mercedes-Benz.
- Porsche.
- Volkswagen.

Notes

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Topic A. BMW (cont'd)

A-2v

Video: Tech/Trends Trivia

Notes

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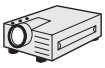
Topic A. BMW (cont'd)



A-3

BMW Pure-Electric ActiveE

The BMW pure-electric ActiveE:

- is based on the 1 Series Coupe.
- has an electric motor mounted between the rear wheels.
- has a lithium-ion battery pack.
- is available for lease-only and only in select areas.

Notes

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Topic A. BMW (cont'd)

A-4v

Video: Aluminum On BMW ActiveHybrid 5

This video highlights the aluminum parts on the 2013 BMW ActiveHybrid 5.

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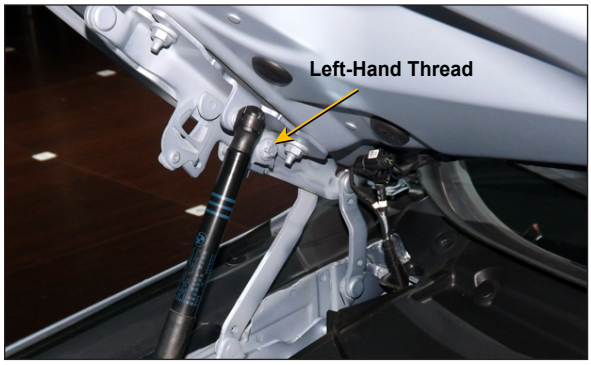
Topic A. BMW (cont'd)

A-5

Hood Hinges On BMW ActiveHybrid 5



The BMW ActiveHybrid 5 has complex hood hinges that:

- can bend out-of-parallel in a collision. The hinges must be replaced if they are out-of-parallel.
- include a left-hand thread bolt on the hood side.
- are pyrotechnic in the European and Asian markets. These areas have more pedestrian traffic than in the U.S. and pedestrian protection is required on all vehicles. An actuator on the bottom lifts the hood up a few inches in the back to provide a cushion. Equipped vehicles also have three sensors in the bumper trim and a control module.

These complex hood hinges are on the conventional and ActiveHybrid 5 Series and 7 Series. The current plan is to equip all U.S. models with these hinges starting with the newest generation of the 7 Series moving forward.

Notes

Objectives Worksheet

The BMW ActiveHybrid 5 has complex hood hinges that:

- include a left-hand thread bolt on the hood side.
- are pyrotechnic in the European and Asian markets. These areas have more pedestrian traffic than in the U.S. and pedestrian protection is required on all vehicles.

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Topic B. Jaguar/Land Rover

B-1v

Video: Tech/Trends Trivia

Notes

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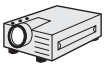
Topic B. Jaguar/Land Rover (cont'd)



B-2

All-Aluminum Land Rover Range Rover

Courtesy of Land Rover.

The fourth generation Land Rover Range Rover is the first aluminum-intensive vehicle for Land Rover. The plan is for all future Land Rovers and Jaguars to be aluminum-intensive. There have been aluminum-intensive Jaguars since 2003 with the launch of the XJ. The Range Rover will be a 2013 or 2014 model, and is:

- completely aluminum. The weight savings of the aluminum body compared to the previous steel body is 180 kg (397 lb). Overall, the vehicle weighs 420 kg (926 lb) less than the previous Range Rover.
- a unibody, just like previous steel Range Rovers. The Range Rover Sport, a smaller version of the full-size Range Rover, is a full-frame vehicle. For now, the Range Rover Sport stays with steel construction.
- the first sport-utility vehicle (SUV) in the world to be aluminum-intensive.

Notes

Objectives Worksheet

All future Land Rovers and Jaguars will be aluminum-intensive. There have been aluminum-intensive Jaguars since 2003 with the launch of the XJ. The 2013 or 2014 Range Rover is the first aluminum-intensive vehicle for Land Rover. The new Range Rover is a unibody, just like previous steel Range Rovers.

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Topic B. Jaguar/Land Rover (cont'd)

The aluminum body is rivet bonded at the factory with self-piercing rivets. The entire part is pressed as a single aluminum panel, thus reducing the number of joints, eliminating complex assemblies, and improving structural integrity.

Notes

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Topic C. Mercedes-Benz

C-1v

Video: Mercedes-Benz SL

This video highlights some of the features on the 2013 Mercedes-Benz SL.

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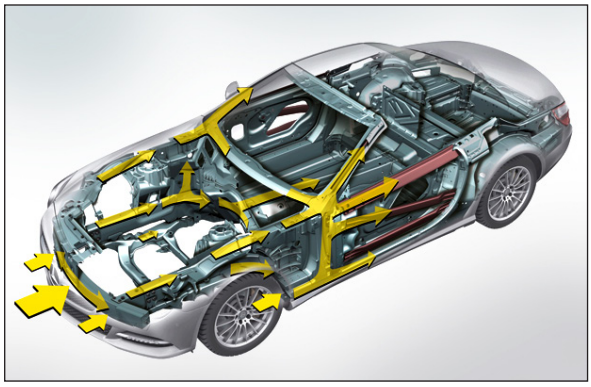
Topic C. Mercedes-Benz (cont'd)

C-2

Aluminum On The Mercedes-Benz SL 550



Courtesy of Daimler AG

The original SL in 1952 had a steel tubular frame. On the 2013 SL 550, there are few parts that are not aluminum. 44% of the vehicle is cast aluminum, 17% extruded aluminum, and 28% sheet aluminum. The Mercedes-Benz SL 550:

- has boron-alloyed tubular steel in the upper A-pillars. The windshield frame exterior is steel sheet metal. This is the only steel on the body of the vehicle. The rear body panel has some magnesium, the rest of the body is aluminum.
- includes a cast aluminum cowl panel.
- has an aluminum transmission tunnel that is tailor-welded to three different thicknesses.

The 2013 SL 550 has an electrochromatic glass roof option. This technology darkens the glass instantly when a button is pushed.

Notes

Objectives Worksheet

On the 2013 Mercedes-Benz SL 550, there are few parts that are not aluminum. There is boron-alloyed tubular steel in the upper A-pillars. The windshield frame exterior is steel sheet metal. This is the only steel on the body of the vehicle. The rear body panel has some magnesium, and the rest of the body is aluminum, including a cast aluminum cowl panel.

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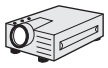
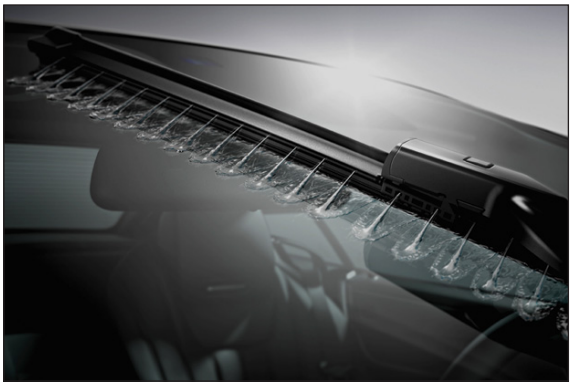
Topic C. Mercedes-Benz (cont'd)



C-3

Magic Windshield Wipers On The Mercedes-Benz SL 550



Courtesy of Daimler AG

The 2013 Mercedes-Benz SL 550 has a new type of adaptive windshield washing system called "Magic Vision Control" which:

- channels the windshield washing fluid through the wiper blades, instead of jets which direct the fluid at the windshield.
- directs the fluid to squirt out of tiny holes directly in front of the wiper blades, for efficient control of the cleaning process. The "magic" name of the system is because the driver cannot see the fluid squirting out of the holes.
- automatically adjusts the fluid/water solution for freezing temperatures or the heat of the summer. Also, the wipers and wiper blades are heated so they do not build up with snow or ice.
- automatically reduces the amount of fluid squirting out when the hardtop is down on the Cabriolet model, preventing fluid from splashing into the vehicle interior.

Notes

Objectives Worksheet

The 2013 Mercedes-Benz SL 550 has a new type of adaptive windshield washing system called "Magic Vision Control" which channels the windshield washing fluid through the wiper blades, instead of jets which direct the fluid at the windshield.

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Topic D. Porsche

D-1v

Video: Aluminum On The Porsche 911 Carrera

This video highlights the aluminum parts on the 2013 Porsche 911 Carrera and 911 Carrera S.

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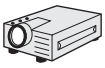
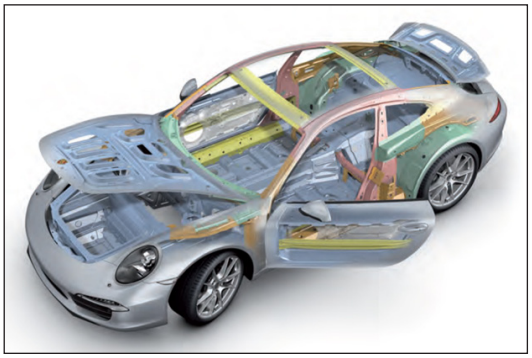
Topic D. Porsche (cont'd)



D-2

Porsche 911 Carrera Repairs



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This new body style is on the Porsche 911 Carrera (991) generation, both the 911 Carrera and the 911 Carrera S. When making repairs on the new 911 Carrera and 911 Carrera S:

- replace self-piercing rivets (SPRs) with blind rivets and adhesive. The rivets have a special corrosion-protection coating and must be ordered from Porsche.
- replace flow drill screws with flow drill screws and adhesive.
- there are welds, both spot welds and GMA (MIG) welds, specified in the repair information.

Notes

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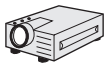
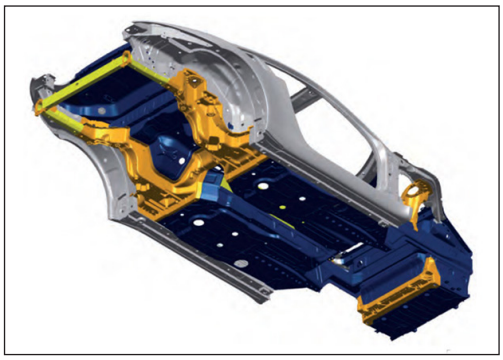
Topic D. Porsche (cont'd)



D-3

Porsche 911 Carrera Repairs (cont'd)



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Some interesting instructions in the Porsche 911 Carrera (991) service information includes:

- a requirement that when parts are replaced with adhesive, wait at least 48 hours before releasing the vehicle to the customer.
- an aluminum front lower rail sectioning procedure that calls for blind rivets, countersunk screws, and adhesive. No welds are made in the sectioning procedure.

Notes

Objectives Worksheet

The Porsche 911 Carrera (991) service information includes a sectioning procedure on the aluminum front lower rails that calls for blind rivets, countersunk screws, and adhesive. No welds are made in the sectioning procedure

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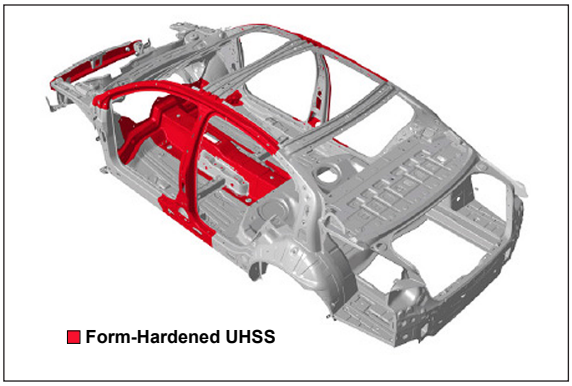
Topic E. Volkswagen

E-1

Form-Hardened UHSS On VW Passat



The Volkswagen Passat, which was redesigned for 2012, has form-hardened UHSS on several parts of the passenger compartment. Form-hardened steel:

- is hot-stamped, boron-alloyed steel that is cooled along the length of the part at different rates.
- results in different strengths along the part with no visible indications. There are no seams, no laser welds.

Form-hardening technology was first used on the 2010 Audi Q5, and is now used on most Audi/ Volkswagen vehicles.

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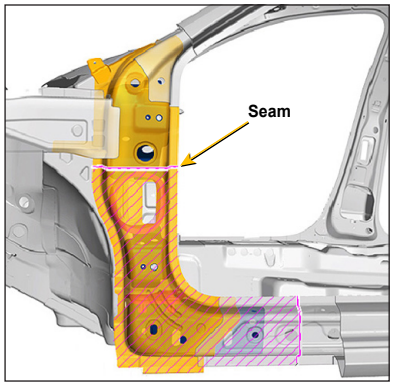
Topic E. Volkswagen (cont'd)

E-2

Repairs On The Volkswagen Passat



Regarding repairs on the Volkswagen Passat, there:

- is a new sectioning procedure on the lower A-pillar reinforcement, just beneath where the upper rail attaches. A foam insert directly behind the joint must be removed, and a new insert installed during the procedure. A GMA (MIG) open butt joint is made along the seam.
- are sectioning procedures on the rocker panel reinforcement, front upper/lower and rear rails, and the trunk floor.

Notes

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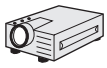
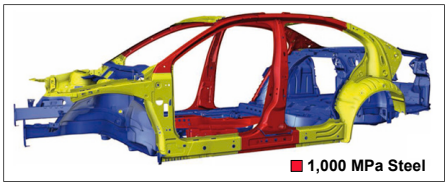
Topic E. Volkswagen (cont'd)



E-3

VW Jetta Hybrid



There is a hybrid version of the Volkswagen Jetta. The Jetta Hybrid:

- is a full parallel hybrid, with a 220-volt lithium-ion battery pack mounted behind the rear seats.
- has a coasting mode, where the engine is decoupled from the drivetrain when the driver releases the accelerator at speeds up to 84 mph.
- has sectioning procedures on the upper and lower front rails, outer A/B-pillars, rocker panels, rear rails, and quarter panels.

Notes

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Topic E. Volkswagen (cont'd)

E-4v

Video: Tech/Trends Trivia

Notes

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Topic F. Conclusion

F-1

Conclusion

Topics covered in this module included features on new vehicles and technology from:

- BMW.
- Land Rover.
- Mercedes-Benz.

Notes

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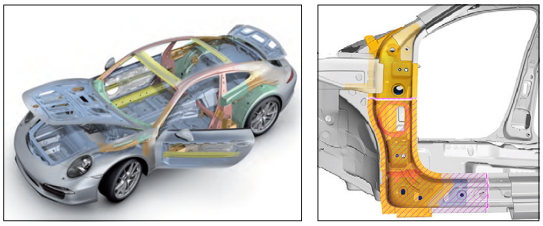
Topic F. Conclusion (cont'd)

F-2

Conclusion (cont'd)



Topics covered in this module included features on new vehicles and technology from:

- Porsche.
- Volkswagen.

Notes

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